

Isogenus nubecula Newman in Flintshire (Plecoptera, Perlodidae)

By A. BRINDLE

Stoneflies are not one of the more popular orders as far as entomologists are concerned: the insects are inconspicuous and perhaps are better known to fresh-water students. The order, however, has a certain amount of interest. It is small, and is one of the few orders which are as well, or even better, represented in the North of England than in the South; although the majority of the species are widely distributed and often common, there are some whose distribution is not well known. The apparent discontinuity of the distribution of *Rhabdiopteryx anglica* Kimmins, for example, is probably due to lack of collectors, and there are three species of which the British status was uncertain—*Isoperla obscura* (Zetterstedt), *Chloroperla apicalis* Newman, and *Isogenus nubecula* Newman, all of which occur in large rivers on the Continent. The first named species was only known from the river Trent, and may have disappeared there owing to pollution, but it seems to be unlikely that it was confined to this single river in England. The status of the first two species is still uncertain, but the status of *I. nubecula* as British has been recently confirmed by Hynes (1963). The purpose of the present paper is to publish details of what appears to be first authenticated British specimen of *Isogenus nubecula*.

Although a number of specimens of this species have been recorded in the past, the specimens have either proved to be *Diura bicaudata* (L.), or, if correctly named, lacked data labels (Hynes, 1963). Late in 1958 the late Mr H. L. Burrows informed Dr H. B. N. Hynes and Mr D. E. Kimmins that he had collected a female specimen of *nubecula*, but Hynes (1963) reported that he had been unable to obtain any further information about the specimen.

At one of the meetings of the Manchester Entomological Society in Autumn, 1958, Burrows showed to the late Dr W. D. Hincks and to the present author, a set specimen which Burrows said was *Isogenus nubecula*. A satisfactory check on the specimen was not possible at the meeting, but neither Hincks nor myself had serious doubts about its identity, largely owing to the known competence of Burrows. Burrows was an excellent and careful entomologist, and had a great appreciation of rarities; he frequently worked in the field with the late Harry Britten, and specialized in the Neuropteroid orders and in the Lepidoptera, but accepted rarities in other orders. Amongst his finds were *Oligotricha clathrata* (Kolenati) (Trichoptera) and *Nathanica fulviceps* (Stephens) (Neuroptera), both in large numbers at Burnt Woods, Staffordshire, and the small *Tabanus plebeius* Fallen (Diptera) at Abbots Moss, Cheshire,

and elsewhere. He also had a large series of the Scotch Argus *Erebia aethiops* (Esper) from its former locality near Grassington, Yorkshire. In later years he turned more particularly to Diptera.

The specimen of *nubecula* was pinned and set with the wings outspread and was in a small glass-topped box; the head of the pin had been cut off and that end of the pin tapered, so that the specimen could be pinned in the box either with the dorsal or the ventral side uppermost. One of the forewings was missing, but otherwise the specimen seemed to be in excellent condition. Both Hincks and myself asked Burrows, separately, where it had been taken, but later discussion with Hincks indicated some discrepancy about the locality, which may well have been an error on our part but was more likely due to the well known reluctance of collectors of rarities to be entirely candid. The area of Whixall Moss, however, was mentioned, but this was thought to be unlikely. Burrows was asked to publish the record in view of its rarity, but this was never done: although his knowledge of field entomology was very great, it was difficult to persuade him to write papers at all, although one short paper on the North-west Psychidae was finally extracted from him for the Transactions of the Manchester Entomological Society in recent years.

For some reason or other, the desirability of checking the specimen of *nubecula* and the locality was not followed up. I am unable to comment on the remark by Hynes (1963) that he was unable to obtain any more information about the specimen.

Nothing further occurred about the specimen until the recent sudden death of Burrows: his collection, in storeboxes, and his notebooks, were rescued from probable destruction by the Secretary of the Manchester Entomological Society, Mr E. H. Fielding, who has since passed over a number of specimens of various orders from the collection to the Manchester Museum. Mr Fielding was asked to look out for the specimen of *nubecula* and the features of the specimen were mentioned, including the missing anterior wing which would make the recognition simple, but he was unable to locate it in the collection of Plecoptera. Very recently, however, the specimen was located in a box crowded with various insects and presented to the Manchester Museum. The Museum is indebted to Mr Fielding for this specimen and for the other specimens from the Burrows collection.

A check on the specimen leaves no doubt that it is *Isogenus nubecula*: it is a female and the subgenital plate of this species is distinctive, being very large, as wide as the abdomen, and with a more or less concave posterior margin. The anterior left wing is missing, and the right forewing shows some differences in venation to the figures in Aubert (1959) and Despax (1951), but the venation of the species appears to be variable, at least in German specimens, and is commented on by Hynes (1963). The figure of the forewing in Hynes (1958, fig. 6 E) shows six

branches to R 2+3 and 4+5, as compared to five branches in Aubert (1959) and Despax (1951). The present specimen has six branches. Hynes (1958, fig. 6E) shows an additional incomplete anterior branch arising from M, basal to RM, and becoming obsolete after the junction with RM. In the present specimen this anterior branch extends to the wing margin, and one additional cross-vein links this branch with the last branch of R4+5, distal to RM, thus forming a cell with RM as its basal side. This venational form is also mentioned in Hynes (1963).

Although the identity of the specimen, which appears to be the first British specimen with a data label, seems certain, the locality is certainly not typical and the date is rather late. The locality is Bettisfield, Flintshire, which lies to the west of Whixall Moss, and is a frequent starting place for entomologists visiting the Moss. From Bettisfield, a walk along the canal bank, itself very productive, leads into Whixall Moss at the south-west corner. The only aquatic habitat of any size near Bettisfield is the Shropshire Union Canal, and no large rivers occur anywhere near the locality. The date is 15.6.1958, whereas Hynes (1963) considers the normal emergence time by the Welsh Dee to be April: however the Perlodidae often have a long emergence time and females of both *Diura* and *Perloides* tend to occur long after their usual times of emergence.

The notebooks belonging to the late Mr Burrows contain a wealth of records from various localities, many of which have changed considerably in subsequent years, but these records consist mainly of dates of occurrence and although the record of *nubecula* occurs amongst the records from Whixall Moss and area, there seem to be no details of exactly where or in what circumstances the specimen of *nubecula* was actually taken. Although Burrows was reticent on localities, his records, when finally given, could be relied on, and it is most unlikely that a wrong locality was given.

The only subsequent records of *Isogenus* from Britain are those nymphs collected by Dr Hynes from the Welsh Dee (Hynes, 1963), which indicate that the species could be more widely distributed. The most satisfactory method of listing the stoneflies from an area is by regular sampling for the nymphs, since these often occur in large numbers, and streams are much more easily searched than terrestrial habitats—the terrestrial adult stoneflies can be most elusive at times. If the nymphs occur in the deeper parts of large rivers, however, the sampling becomes much more difficult and it is in this type of habitat that the nymphs of *nubecula* occurred. It is probably significant that all the three species quoted as being of uncertain British status are all large river species, and more attention to the order by entomologists could well result in the clarification of the status of all three species. Hynes (1963) however found the nymphs to be scarce where found, so that the work involved in searching for nymphs is likely to be arduous, and possibly suitable for the more energetic entomo-

logists. The area around Bettisfield will, of course, be given attention, but *nubecula* is considered to be scarce in Continental localities, so the chances of finding more specimens of *nubecula* at Bettisfield seem remote, apart from the apparent unsuitability of the area.

REFERENCES

- Aubert, J. (1959). *Insecta Helvetica*, 1 (Plecoptera). Lausanne.
 Despax, R. (1951). *Faune de France*, 55 (Plecopteres). Paris.
 Hynes, H. B. N. (1958). *Sci. Publ.*, 17 (Plecoptera). F.B.A., Ambleside.
 ——— (1963). *Isogenus nubecula* Newman in Britain (Plecoptera: Perlodidae). *Proc. R. ent. Soc. Lond.* (A) 28: 12-14.

Green Pupae

By an OLD MOTH HUNTER

On the 27th August, many years ago, I found a green chrysalis. It was suspended in a silken cradle between the leaves of an ash, on a little shoot that rose from the trunk no more than two feet above ground. Having already, at that early age, noted that most chrysalids are green for few hours after the larval skin has been cast off, I added, in my diary recording the discovery, "evidently just pupated". The following day, however, my pupa was still green, a light grassy green, and so it remained until 13th September, when a male Dusky Thorn emerged from it.

Since that far-off day I have bred *Ennomos fuscantaria* many times, and always his pupa remains green. It distresses me. There is something immodest about a green pupa. It is not playing the game. Why do these Dusky Thorns which pupate above ground remain green as pupae? Protective colouration? I doubt it: there are plenty of insects which pupate among growing leaves and their pupae behave decorously. For some reason of which I am ignorant *fuscantaria* throws discretion to the winds and remains a toothsome morsel for birds, in appearance at least, throughout his pupal career. It seems very stupid of him. But perhaps the cradle deceives birds, who mistake it for a spider's web and the pupa for a poisonous green spider.

The Lunar Thorn also inhabits ash trees, but has not yet made up his mind whether brown or green affords the better protection to a pupa; he pupates, normally, as brown as brown can be; but sometimes he decides to go in for an autumn brood, and then his chrysalis remains green until the moth emerges. *Lunaria* usually cocoons among moss, and here a green pupa might have a better chance to elude prying eyes, so why not stick to green for the normal brood? Are ash trees inhabited by large green spiders which appear only in the autumn when *fuscantaria* and *delunaria* (as the men of science call the autumn brood of *lunaria*) have pupated? What